The Hidden Cost of Construction

Pre-construction scanning uses high-precision laser technology to capture the real-world conditions of a site before work begins, creating an accurate digital record of existing structures, utilities, and field conditions. Instead of relying on assumptions, teams can plan around verified data and identify conflicts early–before they turn into delays, redesigns, or expensive rework.

That early visibility is what helps eliminate change orders. When clashes are discovered in advance, developers, architects, engineers, and general contractors can resolve them during planning rather than after mobilization, reducing disruption across the schedule and budget. **For developers and GCs, protecting the bottom line means fewer surprises, tighter cost control, faster decision-making,** and a project that stays aligned with both financial goals and delivery expectations.

CHAPTER 1

The Change Order Crisis

Discover how seemingly routine contract clauses quietly drain project budgets – and why the construction industry is overdue for a smarter approach.

The "Unforeseen Conditions" Trap

Few phrases in a construction contract are more dangerous than **"Unforeseen Conditions."** These clauses quietly expose developers and GCs to unlimited liability when hidden site conditions emerge mid-project.

In today's adaptive reuse market – where aging buildings are converted into luxury residences or modern offices – **the risk is compounded. Outdated records, unknown structural modifications, and buried MEP syste**ms lurk behind every wall, silently killing project pro-formas before the first nail is driven.

The Anatomy of a $50,000 Disaster

The Project

Luxury **office-to-residential retrofit in a 1980s** concrete tower – a high-profile adaptive reuse deal

The Failure

Outdated 2D **as-built drawings** showed a flat slab – missing a critical structural transfer beam entirely

The Impact

A **$53,400 change order** – covering crew standby, re-engineering fees, and rush steel fabrication

Legacy Data = Future Problems

Relying on outdated drawings doesn't just introduce risk – it virtually guarantees costly surprises. Every day construction proceeds on inaccurate information is a day closer to an expensive reckoning.

CHAPTER 2

The Solution: Pre-Construction Scanning

Reality capture technology is transforming how General Contractors approach risk – turning the unknown into a fully documented, actionable dataset before work begins.

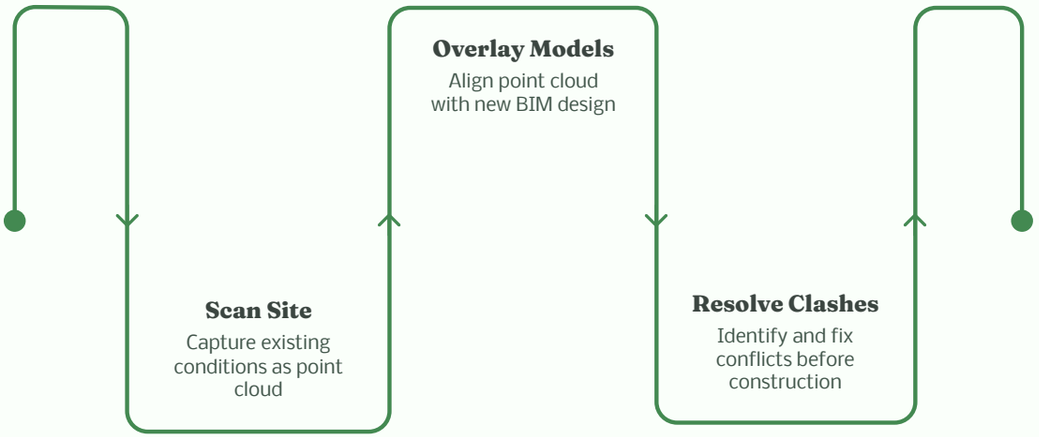
Capturing Reality: The Power of 3D Laser Scanning

3D laser scanning – also known as **High-Definition Surveying (HDS)** or reality capture – uses precision laser pulses to map a space with millimeter-level accuracy.

The result is a **point cloud**: a dense, three-dimensional digital twin of the existing structure that captures every architectural detail, structural element, and MEP system exactly as they are – not as they were drawn decades ago.

- Point clouds become the single source of truth for renovation and retrofit projects.

Clash Detection: Preventing Conflicts Before They Happen


Scan Site
Capture existing conditions as point cloud
Overlay Models
Align point cloud with new BIM design
Resolve Clashes
Identify and fix conflicts before construction

Resolving clashes in a model costs a fraction of fixing them in the field – saving weeks of schedule and tens of thousands in rework costs.

Why This Changes Everything

Structural Conflicts

Hidden beams, columns, and slabs are identified before MEP or architectural systems are designed around them

MEP Coordination

Mechanical, electrical, and plumbing routing conflicts are caught and resolved in the model, not the ceiling

Zero Surprises

Teams arrive on-site with complete confidence – every known condition is already accounted for

1,400%

Estimated ROI

A $3,500 pre-design laser scan would have prevented a $53,400 change order – an exponential return on a modest upfront investment.

The $3,500 "Time Machine"

In the case of the concrete tower retrofit, a single pre-design laser scan – costing approximately **$3,500** – would have detected the hidden structural transfer beam instantly. The project team would have redesigned around it before mobilization, at zero additional cost.

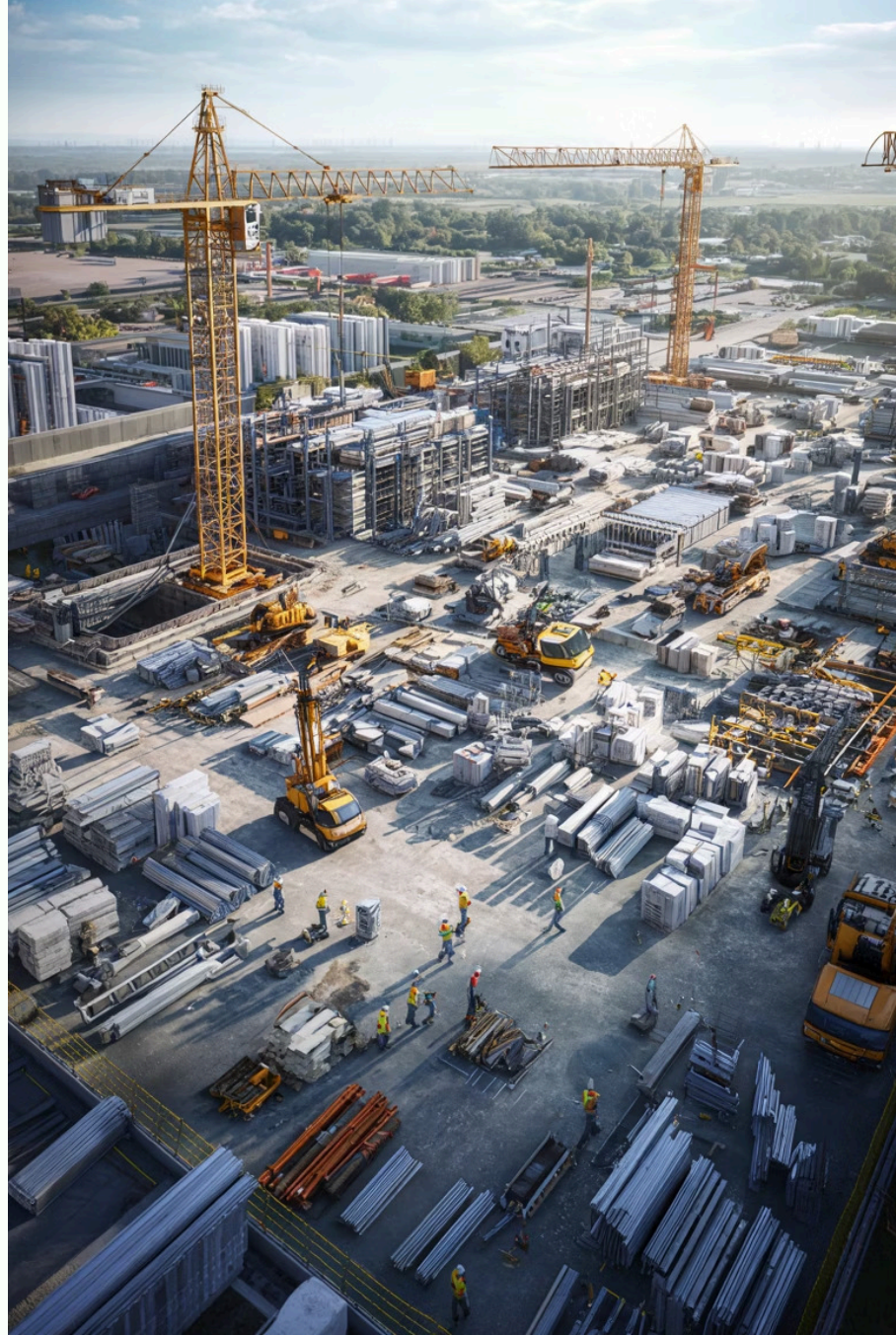
I**nstead, the team paid $53,400 in avoidable change orders. The math is unambiguous:** accurate pre-construction data is exponentially cheaper than discovering errors once crews are standing by at $200/hour.

Every dollar spent on pre-construction scanning eliminates approximately $15 in downstream change order costs.

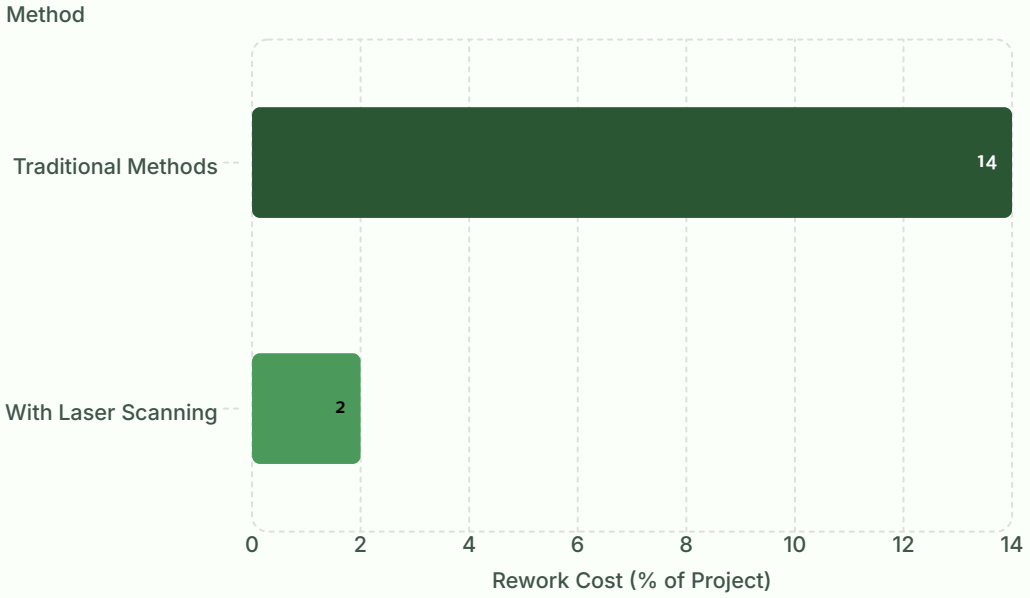
CHAPTER 3

The ROI of Precision

The financial case for pre-construction scanning isn't theoretical – it's measurable, repeatable, and growing stronger as project complexity increases.



Reducing Rework from 15% to 3%



The Numbers Tell the Story

Traditional construction methods routinely result in rework costs of **12–15%** of total project value – a staggering hidden expense absorbed through contingency budgets, schedule extensions, and strained owner relationships.

Projects that integrate 3D laser scanning into pre-construction routinely achieve rework rates of **1–3% or less**. On a $5M renovation, that's a potential savings of **$500,000 to $650,000** – before a single change order is issued.

The Future of Construction: Data-Driven Decisions

Lower Contractor Risk

Accurate as-built documentation exposes inaccuracies before mobilization, giving GCs solid ground to stand on – contractually and operationally.

Better Budget Accuracy

Realistic cost models, reliable contingency figures, and aligned project teams lead to fewer surprises and stronger owner confidence throughout the project lifecycle.

Project Success

GCs who embrace reality capture as a standard practice consistently deliver on schedule, on budget, and with fewer disputes – building reputations that win future work.

Pre-construction scanning is no longer a competitive advantage – it's becoming the baseline expectation for sophisticated owners and developers. GCs who adopt it now lead the market. Those who don't pay for it later.